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1 A fast adaptive grid scheme for elliptic partial differential equations

Calvin J. Ribbens
September 1989 **ACM Transactions on Mathematical Software (TOMS)**, Volume 15 Issue 3
Publisher: ACM Press

Full text available: pdf(1.40 MB) Additional Information: full citation, abstract, references, index terms, review

We describe the Recursive Subdivision (RS) method-an efficient and effective adaptive grid scheme for two-dimensional elliptic partial differential equations (PDEs). The RS method generates a new grid by recursively subdividing a rectangular domain. We use a heuristic approach which attempts to equidistribute a given density function over the domain. The resulting grid is used to generate an adaptive grid domain mapping (AGDM), which may be applied to transform the PDE problem to another co ...

2 PELLPACK: a problem-solving environment for PDE-based applications on multicomputer platforms

E. N. Houstis, J. R. Rice, S. Weerawarana, A. C. Catlin, P. Papachiou, K.-Y. Wang, M. Gaitatzes
March 1998 **ACM Transactions on Mathematical Software (TOMS)**, Volume 24 Issue 1
Publisher: ACM Press

Full text available: pdf(26.30 MB) Additional Information: full citation, abstract, references, citings, index terms, review

The article presents the software architecture and implementation of the problem-solving environment (PSE) PELLPACK for modeling physical objects described by partial differential equations (PDEs). The scope of this PSE is broad, as PELLPACK incorporates many PDE solving systems, and some of these, in turn, include several specific PDE solving methods. Its coverage for 1D, 2D. and 3D elliptic or parabolic problems is quite broad, and it handles some hyperbolic problems, Since a PSE should p ...

Keywords: PDE language, execution models, knowledge bases, libraries, parallel reuse methodologies, problem-solving environments, programming-in-the-large, sofeware bus

3 Numerical computations: its nature and research directions

J. R. Rice, C. W. Gear, J. Ortega, B. Parlett, M. Schultz, L. F. Shampine, P. Wolfe, J. F. Traub
February 1979 **ACM SIGNUM Newsletter**, Volume 14 Issue si-1